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## Cosmetic and/or Pharmaceutical Preparations

AI > *Background of the Invention*  
Field of the Invention

This invention relates generally to cosmetics and more particularly to preparations containing certain sugar surfactants in combination with hydroxycarboxylic acid partial esters and to the use of the mixtures for the production of certain surface-active compositions.

### Prior Art

Alkyl oligoglycosides are surfactants which, put simply, combine the foaming power of anionic surfactants with the dermatological compatibility of nonionic surfactants. By virtue of these two properties and their compatibility with virtually all other cosmetic ingredients, glycosides are now firmly established in the field of manual dishwashing detergents and particularly cosmetics. Nevertheless, alkyl oligoglucosides still have deficiencies. Thus, although the basic foam is adequate, foam stability is significantly poorer than that of alkyl ether sulfates. In addition, an improvement in compatibility with ophthalmic mucous membrane would be advantageous.

Reference is made in this connection to European patent **EP 0258814 B1** (Auschem) which describes esters of alkyl oligoglucosides with hydroxycarboxylic acids, for example citric acid or tartaric acid, and their use in cosmetics. Although these substances - which have a covalent bond between one of the carboxylic acid groups of the hydroxy acids and the primary hydroxyl group of the glycosides - are known to be mild, they do have weaknesses in their compatibility with ophthalmic mucous membrane. In addition, their foam stability in hard water is unsatisfactory, especially in the presence of sebum.

Accordingly, the problem addressed by the present invention was to

provide new preparations based on alk(en)yl oligoglycosides which would be distinguished by improved dermatological compatibility, particularly ophthalmic mucous membrane compatibility, and more favorable foaming kinetics.

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### **Description of the Invention**

The present invention relates to cosmetic and/or pharmaceutical preparations containing

- 10 (a) alkyl and/or alkenyl oligoglycosides and  
(b) hydroxycarboxylic acid partial esters and/or salts thereof.

It has surprisingly been found that the preparations according to the invention are distinguished by particular dermatological and ophthalmic  
15 mucous membrane compatibility and show good foaming behavior and high foam stability in hard water, even with high levels of fat. It has also been found that the mixtures are particularly easy to thicken by addition of fatty alcohols, significantly improve the substantivity of cationic polymers, allow the stable incorporation of even relatively large quantities of silicones  
20 and increase the photostability of UV protection factors.

### **Alkyl and/or alkenyl oligoglycosides**

Alkyl and alkenyl oligoglycosides are known nonionic surfactants which correspond to formula (I):

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where  $\text{R}^1$  is an alkyl and/or alkenyl group containing 4 to 22 carbon atoms, G is a sugar unit containing 5 or 6 carbon atoms and p is a number of 1 to  
30 10. They may be obtained by the relevant methods of preparative organic

chemistry. **EP-A1 0 301 298** and **WO 90/03977** are cited here as representative of the literature abundantly available on the subject.

The alkyl and/or alkenyl oligoglycosides may be derived from aldoses or ketoses containing 5 or 6 carbon atoms, preferably glucose.

5 Accordingly, the preferred alkyl and/or alkenyl oligoglycosides are alkyl and/or alkenyl oligoglucosides. The index  $p$  in general formula (I) indicates the degree of oligomerization (DP), i.e. the distribution of mono- and oligoglycosides, and is a number of 1 to 10. Whereas  $p$  in a given compound must always be an integer and, above all, may assume a value

10 of 1 to 6, the value  $p$  for a certain alkyl oligoglycoside is an analytically determined calculated quantity which is generally a broken number. Alkyl and/or alkenyl oligoglycosides having an average degree of oligomerization  $p$  of 1.1 to 3.0 are preferably used. Alkyl and/or alkenyl oligoglycosides having a degree of oligomerization of less than 1.7 and, more particularly,

15 between 1.2 and 1.4 are preferred from the applicational perspective.

The alkyl or alkenyl group  $R^1$  may be derived from primary alcohols containing 4 to 11 and preferably 8 to 10 carbon atoms. Typical examples are butanol, caproic alcohol, caprylic alcohol, capric alcohol and undecyl alcohol and the technical mixtures thereof obtained, for example, in the

20 hydrogenation of technical fatty acid methyl esters or in the hydrogenation of aldehydes from Roelen's oxosynthesis. Alkyl oligoglucosides having a chain length of  $C_8$  to  $C_{10}$  ( $DP = 1$  to  $3$ ), which are obtained as first runnings in the separation of technical  $C_{8-18}$  coconut oil fatty alcohol by distillation and which may contain less than 6% by weight of  $C_{12}$  alcohol as an im-

25 purity, and also alkyl oligoglucosides based on technical  $C_{9/11}$  oxoalcohols ( $DP = 1$  to  $3$ ) are preferred.

In addition, the alkyl or alkenyl group  $R^1$  may also be derived from primary alcohols containing 12 to 22 and preferably 12 to 14 carbon atoms. Typical examples are lauryl alcohol, myristyl alcohol, cetyl alcohol, palmito-

30 leyl alcohol, stearyl alcohol, isostearyl alcohol, oleyl alcohol, elaidyl alcohol,

petroselinyl alcohol, arachyl alcohol, gadoleyl alcohol, behenyl alcohol, erucyl alcohol, brassidyl alcohol and technical mixtures thereof which may be obtained as described above. Alkyl oligoglucosides based on hydrogenated C<sub>12/14</sub> coconut oil fatty alcohol having a DP of 1 to 3 are preferred.

#### Hydroxycarboxylic acid partial esters and their salts

Hydroxycarboxylic acid partial esters are known nonionic surfactants which are available on an industrial scale and which are often used, for example, as food-grade emulsifiers. The substances which form component (b) are preferably esters of hydroxycarboxylic acids containing 1 to 6 carbon atoms, especially esters of hydroxycarboxylic acids selected from the group consisting of lactic acid, tartaric acid, malic acid and citric acid and self-condensation products thereof. The partial esters are anionic surfactants, i.e. compounds which still contain at least one free carboxylic group. Accordingly, they may be acidic esters or neutralization products thereof. The partial esters are preferably present in the form of their alkali metal, alkaline earth metal, ammonium, alkyl ammonium, alkanol-ammonium and/or glucammonium salts. The esters are also preferably derived from fatty alcohols containing 6 to 22 carbon atoms. Accordingly, typical examples are hydroxycarboxylic acid partial esters based on caproic alcohol, caprylic alcohol, 2-ethylhexyl alcohol, capric alcohol, lauryl alcohol, isotridecyl alcohol, myristyl alcohol, cetyl alcohol, palmitoleyl alcohol, stearyl alcohol, isostearyl alcohol, oleyl alcohol, elaidyl alcohol, petroselinyl alcohol, linolyl alcohol, linolenyl alcohol, elaeostearyl alcohol, arachyl alcohol, gadoleyl alcohol, behenyl alcohol, erucyl alcohol and brassidyl alcohol and technical mixtures thereof. Hydroxycarboxylic acid partial esters based on technical coconut fatty alcohols are preferably used. However, oxoalcohols, such as Neodols (Shell), may also be used. In addition, preparations containing as component (b) esters of

hydroxycarboxylic acids with fatty alcohols of which the alk(en)yl group corresponds to that of the alk(en)yl oligoglycosides are particularly preferred. Monoesters and/or diesters of tartaric acid with C<sub>10-18</sub> fatty alcohols have also proved to be particularly advantageous in terms of foaming behavior and compatibility. Finally, the preparations may contain the alkyl and/or alkenyl oligoglycosides and hydroxycarboxylic acid partial esters in a ratio by weight of 1:99 to 99:1, preferably 5:95 to 95:5, more preferably 10:90 to 90:10, most preferably 25:75 to 75:25 and, in one most particularly preferred embodiment, 40:60 to 60:40. The preparations are generally present in the form of aqueous solutions or pastes which have a solids content (corresponding to the active substance content or to the nonaqueous component) of 5 to 50, preferably 10 to 35 and more particularly 15 to 25% by weight.

### 15 Commercial Applications

The mixtures according to the invention of (a) alkyl and/or alkenyl oligoglycosides and (b) hydroxycarboxylic acid partial esters are distinguished by particular dermatological and ophthalmic mucous membrane compatibility and show good foaming behavior and high foam stability in hard water, even with high levels of fat. Accordingly, the present invention also relates to their use for the production of cosmetic and/or pharmaceutical preparations in which they may be present in quantities of 0.1 to 50% by weight, preferably 1 to 30% by weight and more particularly 2 to 15% by weight.

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### Cosmetic and/or pharmaceutical preparations

The surfactant mixtures according to the invention may be used for the production of cosmetic and/or pharmaceutical preparations, for example hair shampoos, hair lotions, foam baths, shower baths, creams, gels, lotions, alcoholic and aqueous/alcoholic solutions, emulsions, wax/fat

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compounds, stick preparations, powders or ointments. These preparations may also contain mild surfactants, oil components, emulsifiers, superfatting agents, pearlizing waxes, consistency factors, thickeners, polymers, silicone compounds, fats, waxes, lecithins, phospholipids, stabilizers, biogenic agents, deodorizers, antiperspirants, antidandruff agents, film  
5 formers, swelling agents, UV protection factors, antioxidants, hydrotropes, preservatives, insect repellents, self-tanning agents, tyrosine inhibitors (depigmenting agents), solubilizers, perfume oils, dyes and the like as further auxiliaries and additives.

10 Typical examples of suitable mild, i.e. particularly dermatologically compatible, **surfactants** are fatty alcohol polyglycol ether sulfates, monoglyceride sulfates, mono- and/or dialkyl sulfosuccinates, fatty acid isethionates, fatty acid sarcosinates, fatty acid taurides, fatty acid glutamates,  $\alpha$ -olefin sulfonates, ether carboxylic acids, fatty acid  
15 glucamides, alkylamidobetaines and/or protein fatty acid condensates, preferably based on wheat proteins.

Suitable **oil components** are, for example, Guerbet alcohols based on fatty alcohols containing 6 to 18 and preferably 8 to 10 carbon atoms, esters of linear C<sub>6-22</sub> fatty acids with linear C<sub>6-22</sub> fatty alcohols, esters of  
20 branched C<sub>6-13</sub> carboxylic acids with linear C<sub>6-22</sub> fatty alcohols such as, for example, myristyl myristate, myristyl palmitate, myristyl stearate, myristyl isostearate, myristyl oleate, myristyl behenate, myristyl erucate, cetyl myristate, cetyl palmitate, cetyl stearate, cetyl isostearate, cetyl oleate, cetyl behenate, cetyl erucate, stearyl myristate, stearyl palmitate, stearyl  
25 stearate, stearyl isostearate, stearyl oleate, stearyl behenate, stearyl erucate, isostearyl myristate, isostearyl palmitate, isostearyl stearate, isostearyl isostearate, isostearyl oleate, isostearyl behenate, isostearyl oleate, oleyl myristate, oleyl palmitate, oleyl stearate, oleyl isostearate, oleyl oleate, oleyl behenate, oleyl erucate, behenyl myristate, behenyl  
30 palmitate, behenyl stearate, behenyl isostearate, behenyl oleate, behenyl

behenate, behenyl erucate, erucyl myristate, erucyl palmitate, erucyl stearate, erucyl isostearate, erucyl oleate, erucyl behenate and erucyl erucate. Also suitable are esters of linear C<sub>6-22</sub> fatty acids with branched alcohols, more particularly 2-ethyl hexanol, esters of hydroxycarboxylic acids with linear or branched C<sub>6-22</sub> fatty alcohols, more especially Dioctyl Malate, esters of linear and/or branched fatty acids with polyhydric alcohols (for example propylene glycol, dimer diol or trimer triol) and/or Guerbet alcohols, triglycerides based on C<sub>6-10</sub> fatty acids, liquid mono-/di-/triglyceride mixtures based on C<sub>6-18</sub> fatty acids, esters of C<sub>6-22</sub> fatty alcohols and/or Guerbet alcohols with aromatic carboxylic acids, more particularly benzoic acid, esters of C<sub>2-12</sub> dicarboxylic acids with linear or branched alcohols containing 1 to 22 carbon atoms or polyols containing 2 to 10 carbon atoms and 2 to 6 hydroxyl groups, vegetable oils, branched primary alcohols, substituted cyclohexanes, linear and branched C<sub>6-22</sub> fatty alcohol carbonates, Guerbet carbonates, esters of benzoic acid with linear and/or branched C<sub>6-22</sub> alcohols (for example Finsolv® TN), linear or branched, symmetrical or nonsymmetrical dialkyl ethers containing 6 to 22 carbon atoms per alkyl group, ring opening products of epoxidized fatty acid esters with polyols, silicone oils and/or aliphatic or naphthenic hydrocarbons, for example squalane, squalene or dialkyl cyclohexanes.

Suitable **emulsifiers** are, for example, nonionic surfactants from at least one of the following groups:

- products of the addition of 2 to 30 moles of ethylene oxide and/or 0 to 5 moles of propylene oxide onto linear C<sub>8-22</sub> fatty alcohols, C<sub>12-22</sub> fatty acids, alkyl phenols containing 8 to 15 carbon atoms in the alkyl group and alkylamines containing 8 to 22 carbon atoms in the alkyl group;
- products of the addition of 1 to 15 moles of ethylene oxide onto castor oil and/or hydrogenated castor oil;

- products of the addition of 15 to 60 moles of ethylene oxide onto castor oil and/or hydrogenated castor oil;
- partial esters of glycerol and/or sorbitan with unsaturated, linear or saturated, branched fatty acids containing 12 to 22 carbon atoms and/or hydroxycarboxylic acids containing 3 to 18 carbon atoms and addition products thereof with 1 to 30 moles of ethylene oxide;
- partial esters of polyglycerol (average degree of self-condensation 2 to 8), polyethylene glycol (molecular weight 400 to 5,000), trimethylolpropane, pentaerythritol, sugar alcohols (for example sorbitol), alkyl glucosides (for example methyl glucoside, butyl glucoside, lauryl glucoside) and polyglucosides (for example cellulose) with saturated and/or unsaturated, linear or branched fatty acids containing 12 to 22 carbon atoms and/or hydroxycarboxylic acids containing 3 to 18 carbon atoms and addition products thereof with 1 to 30 moles of ethylene oxide;
- mixed esters of pentaerythritol, fatty acids, citric acid and fatty alcohol according to **DE 11 65 574 PS** and/or mixed esters of fatty acids containing 6 to 22 carbon atoms, methyl glucose and polyols, preferably glycerol or polyglycerol,
- mono-, di- and trialkyl phosphates and mono-, di- and/or tri-PEG-alkyl phosphates and salts thereof,
- wool wax alcohols,
- polysiloxane/polyalkyl/polyether copolymers and corresponding derivatives,
- polyalkylene glycols and
- glycerol carbonate.

The **addition products of ethylene oxide and/or propylene oxide** with fatty alcohols, fatty acids, alkylphenols or with castor oil are known commercially available products. They are homolog mixtures of which the



average degree of alkoxylation corresponds to the ratio between the quantities of ethylene oxide and/or propylene oxide and substrate with which the addition reaction is carried out. C<sub>12/18</sub> fatty acid monoesters and diesters of adducts of ethylene oxide with glycerol are known as refatting agents for cosmetic formulations from **DE 2024051 PS**.

Typical examples of suitable **partial glycerides** are hydroxystearic acid monoglyceride, hydroxystearic acid diglyceride, isostearic acid monoglyceride, isostearic acid diglyceride, oleic acid monoglyceride, oleic acid diglyceride, ricinoleic acid monoglyceride, ricinoleic acid diglyceride, linoleic acid monoglyceride, linoleic acid diglyceride, linolenic acid monoglyceride, linolenic acid diglyceride, erucic acid monoglyceride, erucic acid diglyceride, tartaric acid monoglyceride, tartaric acid diglyceride, citric acid monoglyceride, citric acid diglyceride, malic acid monoglyceride, malic acid diglyceride and technical mixtures thereof which may still contain small quantities of triglyceride from the production process. Addition products of 1 to 30 and preferably 5 to 10 moles of ethylene oxide with the partial glycerides mentioned are also suitable.

Suitable **sorbitan esters** are sorbitan monoisostearate, sorbitan sesquiisostearate, sorbitan diisostearate, sorbitan triisostearate, sorbitan monooleate, sorbitan sesquioleate, sorbitan dioleate, sorbitan trioleate, sorbitan monoerucate, sorbitan sesquierucate, sorbitan dierucate, sorbitan trierucate, sorbitan monoricinoleate, sorbitan sesquiricinoleate, sorbitan diricinoleate, sorbitan triricinoleate, sorbitan monohydroxystearate, sorbitan sesquihydroxystearate, sorbitan dihydroxystearate, sorbitan trihydroxystearate, sorbitan monotartrate, sorbitan sesquitartrate, sorbitan ditartrate, sorbitan tritartrate, sorbitan monocitrate, sorbitan sesquicitrate, sorbitan dicitrate, sorbitan tricitrate, sorbitan monomaleate, sorbitan sesquimaleate, sorbitan dimaleate, sorbitan trimaleate and technical mixtures thereof. Addition products of 1 to 30 and preferably 5 to 10 moles of ethylene oxide with the sorbitan esters mentioned are also suitable.

Typical examples of suitable **polyglycerol esters** are Polyglyceryl-2 Dipolyhydroxystearate (Dehymuls® PGPH), Polyglycerin-3-Diisostearate (Lameform® TGI), Polyglyceryl-4 Isostearate (Isolan® GI 34), Polyglyceryl-3 Oleate, Diisostearoyl Polyglyceryl-3 Diisostearate (Isolan® PDI), Polyglyceryl-3 Methylglucose Distearate (Tego Care® 450), Polyglyceryl-3 Beeswax (Cera Bellina®), Polyglyceryl-4 Caprate (Polyglycerol Caprate T2010/90), Polyglyceryl-3 Cetyl Ether (Chimexane® NL), Polyglyceryl-3 Distearate (Cremophor® GS 32) and Polyglyceryl Polyricinoleate (Admul® WOL 1403), Polyglyceryl Dimerate Isostearate and mixtures thereof.

Examples of other suitable **polyol esters** are the mono-, di- and triesters of trimethylol propane or pentaerythritol with lauric acid, cocofatty acid, tallow fatty acid, palmitic acid, stearic acid, oleic acid, behenic acid and the like optionally reacted with 1 to 30 moles of ethylene oxide.

**Zwitterionic surfactants** may also be used as emulsifiers.

Zwitterionic surfactants are surface-active compounds which contain at least one quaternary ammonium group and at least one carboxylate and one sulfonate group in the molecule. Particularly suitable zwitterionic surfactants are the so-called betaines, such as the N-alkyl-N,N-dimethyl ammonium glycinate, for example cocoalkyl dimethyl ammonium glycinate, N-acylaminopropyl-N,N-dimethyl ammonium glycinate, for example cocoacylaminopropyl dimethyl ammonium glycinate, and 2-alkyl-3-carboxymethyl-3-hydroxyethyl imidazolines containing 8 to 18 carbon atoms in the alkyl or acyl group and cocoacylaminoethyl hydroxyethyl carboxymethyl glycinate. The fatty acid amide derivative known by the CTFA name of *Cocamidopropyl Betaine* is particularly preferred. Other suitable emulsifiers are ampholytic surfactants. Ampholytic surfactants are surface-active compounds which, in addition to a C<sub>8/18</sub> alkyl or acyl group, contain at least one free amino group and at least one -COOH or -SO<sub>3</sub>H group in the molecule and which are capable of forming inner salts.

Examples of suitable ampholytic surfactants are N-alkyl glycines, N-alkyl

propionic acids, N-alkylaminobutyric acids, N-alkyliminodipropionic acids, N-hydroxyethyl-N-alkylamidopropyl glycines, N-alkyl taurines, N-alkyl sarcosines, 2-alkylaminopropionic acids and alkylaminoacetic acids containing around 8 to 18 carbon atoms in the alkyl group. Particularly preferred ampholytic surfactants are N-cocoalkylaminopropionate, 'cocoacyl-aminoethyl aminopropionate and C<sub>12/18</sub> acyl sarcosine.

Finally, other suitable emulsifiers are **cationic surfactants**, those of the esterquat type, preferably methyl-quaternized difatty acid triethanolamine ester salts, being particularly preferred.

10 The **superfating agents** used may be such substances as, for example, lanolin and lecithin and polyethoxylated or acylated lanolin and lecithin derivatives, polyol fatty acid esters, monoglycerides and fatty acid alkanolamides, the latter also serving as foam stabilizers.

Suitable **pearlizing waxes** are, for example, alkylene glycol esters, 15 particularly ethylene glycol distearate; fatty acid alkanolamides, especially cocofatty acid diethanolamide; partial glycerides, especially stearic acid monoglyceride; esters of polybasic, optionally hydroxysubstituted carboxylic acids with fatty alcohols containing 6 to 22 carbon atoms, especially long-chain esters of tartaric acid; fatty compounds, for example 20 fatty alcohols, fatty ketones, fatty aldehydes, fatty ethers and fatty carbonates which contain a total of at least 24 carbon atoms, especially laurone and distearyl ether; fatty acids, such as stearic acid, hydroxystearic acid or behenic acid, ring opening products of olefin epoxides containing 12 to 22 carbon atoms with fatty alcohols containing 12 to 22 carbon atoms and/or polyols containing 2 to 15 carbon atoms and 2 to 10 hydroxyl groups; and mixtures thereof.

The **consistency factors** used are mainly fatty alcohols or hydroxyfatty alcohols containing 12 to 22 and preferably 16 to 18 carbon atoms and also partial glycerides, fatty acids or hydroxyfatty acids. A 30 combination of these substances with alkyl oligoglucosides and/or fatty acid

N-methyl glucamides of the same chain length and/or polyglycerol poly-12-hydroxystearates is preferably used.

Suitable **thickeners** are, for example, Aerosil types (hydrophilic silicas), polysaccharides, more particularly xanthan gum, guar guar, agar  
5 agar, alginates and tyloses, carboxymethyl cellulose and hydroxyethyl cellulose, relatively high molecular weight polyethylene glycol monoesters and diesters of fatty acids, polyacrylates (for example Carbopols® [Goodrich] or Synthalens® [Sigma]), polyacrylamides, polyvinyl alcohol and polyvinyl pyrrolidone, surfactants such as, for example, ethoxylated fatty  
10 acid glycerides, esters of fatty acids with polyols such as, for example, pentaerythritol or trimethylol propane, narrow-range fatty alcohol ethoxylates or alkyl oligoglucosides and electrolytes, such as sodium chloride and ammonium chloride.

Suitable **cationic polymers** are, for example, cationic cellulose  
15 derivatives such as, for example, the quaternized hydroxyethyl cellulose obtainable from Amerchol under the name of Polymer JR 400®, cationic starch, copolymers of diallyl ammonium salts and acrylamides, quaternized vinyl pyrrolidone/vinyl imidazole polymers such as, for example, Luviquat® (BASF), condensation products of polyglycols and amines, quaternized  
20 collagen polypeptides such as, for example, Lauryldimonium Hydroxypropyl Hydrolyzed Collagen (Lamequat® L, Grünau), quaternized wheat polypeptides, polyethyleneimine, cationic silicone polymers such as, for example, Amodimethicone, copolymers of adipic acid and dimethylamino-hydroxypropyl diethylenetriamine (Cartaretine®, Sandoz), copolymers of  
25 acrylic acid with dimethyl diallyl ammonium chloride (Merquat® 550, Chemviron), polyaminopolyamides as described, for example, in **FR 2 252 840 A** and crosslinked water-soluble polymers thereof, cationic chitin derivatives such as, for example, quaternized chitosan, optionally in micro-crystalline distribution, condensation products of dihaloalkyls, for example  
30 dibromobutane, with bis-dialkylamines, for example bis-dimethylamino-1,3-

propane, cationic guar gum such as, for example, Jaguar®CBS, Jaguar®C-17, Jaguar®C-16 of Celanese, quaternized ammonium salt polymers such as, for example, Mirapol® A-15, Mirapol® AD-1, Mirapol® AZ-1 of Miranol.

5           Suitable **anionic, zwitterionic, amphoteric and nonionic polymers** are, for example, vinyl acetate/crotonic acid copolymers, vinyl pyrrolidone/vinyl acrylate copolymers, vinyl acetate/butyl maleate/isobornyl acrylate copolymers, methyl vinylether/maleic anhydride copolymers and esters thereof, uncrosslinked and polyol-crosslinked polyacrylic acids,  
10       acrylamidopropyl trimethylammonium chloride/acrylate copolymers, octylacrylamide/methyl methacrylate/tert.-butylaminoethyl methacrylate/2-hydroxypropyl methacrylate copolymers, polyvinyl pyrrolidone, vinyl pyrrolidone/vinyl acetate copolymers, vinyl pyrrolidone/dimethylaminoethyl methacrylate/vinyl caprolactam terpolymers and optionally derivatized  
15       cellulose ethers and silicones.

          Suitable **silicone compounds** are, for example, dimethyl polysiloxanes, methylphenyl polysiloxanes, cyclic silicones and amino-, fatty acid-, alcohol-, polyether-, epoxy-, fluorine-, glycoside- and/or alkyl-modified silicone compounds which may be both liquid and resin-like at room  
20       temperature. Other suitable silicone compounds are simethicones which are mixtures of dimethicones with an average chain length of 200 to 300 dimethylsiloxane units and hydrogenated silicates. A detailed overview of suitable volatile silicones can be found in Todd et al. in **Cosm. Toil. 91, 27 (1976)**.

25           Typical examples of **fats** are glycerides while suitable **waxes** are inter alia natural waxes such as, for example, candelilla wax, carnauba wax, Japan wax, espartograss wax, cork wax, guaruma wax, rice oil wax, sugar cane wax, ouricury wax, montan wax, beeswax, shellac wax, spermaceti, lanolin (wool wax), uropygial fat, ceresine, ozocerite (earth  
30       wax), petrolatum, paraffin waxes, microwaxes; chemically modified waxes

(hard waxes) such as, for example, montan ester waxes, sasol waxes, hydrogenated jojoba waxes and synthetic waxes such as, for example, polyalkylene waxes and polyethylene glycol waxes. Besides fats, fat-like substances, such as **lecithins** and **phospholipids**, are suitable additives.

5 Lecithins are known among experts as glycerophospholipids which are formed from fatty acids, glycerol, phosphoric acid and choline by esterification. Accordingly, lecithins are also frequently referred to by experts as phosphatidyl cholines (PCs). Examples of natural lecithins are the kephalins which are also known as phosphatidic acids and which are  
10 derivatives of 1,2-diacyl-sn-glycerol-3-phosphoric acids. By contrast, phospholipids are generally understood to be mono- and preferably diesters of phosphoric acid with glycerol (glycerophosphates) which are normally classed as fats. Sphingosines and sphingolipids are also suitable.

Metal salts of fatty acids such as, for example, magnesium,  
15 aluminium and/or zinc stearate or ricinoleate may be used as **stabilizers**.

In the context of the invention, **biogenic agents** are, for example, tocopherol, tocopherol acetate, tocopherol palmitate, ascorbic acid, deoxyribonucleic acid, retinol, bisabolol, allantoin, phytantriol, panthenol, AHA acids, amino acids, ceramides, pseudoceramides, essential oils, plant  
20 extracts and vitamin complexes.

Cosmetic **deodorants** counteract, mask or eliminate body odors. Body odors are formed through the action of skin bacteria on apocrine perspiration which results in the formation of unpleasant-smelling degradation products. Accordingly, deodorants contain active principles  
25 which act as germ inhibitors, enzyme inhibitors, odor absorbers or odor maskers.

Basically, suitable **germ inhibitors** are any substances which act against gram-positive bacteria such as, for example, 4-hydroxybenzoic acid and salts and esters thereof, N-(4-chlorophenyl)-N'-(3,4-  
30 dichlorophenyl)-urea, 2,4,4'-trichloro-2'-hydroxydiphenylether (triclosan), 4-

chloro-3,5-dimethylphenol, 2,2'-methylene-bis-(6-bromo-4-chlorophenol), 3-methyl-4-(1-methylethyl)-phenol, 2-benzyl-4-chlorophenol, 3-(4-chlorophenoxy)-propane-1,2-diol, 3-iodo-2-propinyl butyl carbamate, chlorhexidine, 3,4,4'-trichlorocarbanilide (TTC), antibacterial perfumes, thymol,  
5 thyme oil, eugenol, nettle oil, menthol, mint oil, farnesol, phenoxyethanol, glycerol monolaurate (GML), diglycerol monocaprate (DMC), salicylic acid-N-alkylamides such as, for example, salicylic acid-n-octyl amide or salicylic acid-n-decyl amide.

Suitable **enzyme inhibitors** are, for example, esterase inhibitors.  
10 Esterase inhibitors are preferably trialkyl citrates, such as trimethyl citrate, tripropyl citrate, triisopropyl citrate, tributyl citrate and, in particular, triethyl citrate (Hydagen® CAT, Henkel KGaA, Düsseldorf, FRG). Esterase inhibitors inhibit enzyme activity and thus reduce odor formation. Other esterase inhibitors are sterol sulfates or phosphates such as, for example,  
15 lanosterol, cholesterol, campesterol, stigmasterol and sitosterol sulfate or phosphate, dicarboxylic acids and esters thereof, for example glutaric acid, glutaric acid monoethyl ester, glutaric acid diethyl ester, adipic acid, adipic acid monoethyl ester, adipic acid diethyl ester, malonic acid and malonic acid diethyl ester, hydroxycarboxylic acids and esters thereof, for example  
20 citric acid, malic acid, tartaric acid or tartaric acid diethyl ester; and zinc glycinate.

Suitable **odor absorbers** are substances which are capable of absorbing and largely retaining the odor-forming compounds. They reduce the partial pressure of the individual components and thus also reduce the  
25 rate at which they spread. An important requirement in this regard is that perfumes must remain unimpaired. Odor absorbers are not active against bacteria. They contain, for example, a complex zinc salt of ricinoleic acid or special perfumes of largely neutral odor known to the expert as "fixateurs" such as, for example, extracts of labdanum or styrax or certain  
30 abietic acid derivatives as their principal component. Odor maskers are

perfumes or perfume oils which, besides their odor-masking function, impart their particular perfume note to the deodorants. Suitable perfume oils are, for example, mixtures of natural and synthetic fragrances. Natural fragrances include the extracts of blossoms, stems and leaves, fruits, fruit  
5 peel, roots, woods, herbs and grasses, needles and branches, resins and balsams. Animal raw materials, for example civet and beaver, may also be used. Typical synthetic perfume compounds are products of the ester, ether, aldehyde, ketone, alcohol and hydrocarbon type. Examples of perfume compounds of the ester type are benzyl acetate, p-tert.butyl  
10 cyclohexylacetate, linalyl acetate, phenyl ethyl acetate, linalyl benzoate, benzyl formate, allyl cyclohexyl propionate, styrallyl propionate and benzyl salicylate. Ethers include, for example, benzyl ethyl ether while aldehydes include, for example, the linear alkanals containing 8 to 18 carbon atoms, citral, citronellal, citronellyloxyacetaldehyde, cyclamen aldehyde, hydroxy-  
15 citronellal, lilial and bourgeonal. Examples of suitable ketones are the ionones and methyl cedryl ketone. Suitable alcohols are anethol, citronellol, eugenol, isoeugenol, geraniol, linalool, phenylethyl alcohol and terpeneol. The hydrocarbons mainly include the terpenes and balsams. However, it is preferred to use mixtures of different perfume compounds which, together,  
20 produce an agreeable fragrance. Other suitable perfume oils are essential oils of relatively low volatility which are mostly used as aroma components. Examples are sage oil, camomile oil, clove oil, melissa oil, mint oil, cinnamon leaf oil, lime-blossom oil, juniper berry oil, vetiver oil, olibanum oil, galbanum oil, labolanum oil and lavandin oil. The following are preferably used either individually or in the form of mixtures: bergamot oil,  
25 dihydromyrcenol, lilial, lyral, citronellol, phenylethyl alcohol,  $\alpha$ -hexyl-cinnamaldehyde, geraniol, benzyl acetone, cyclamen aldehyde, linalool, Boisambrene Forte, Ambroxan, indole, hedione, sandelice, citrus oil, mandarin oil, orange oil, allylamyl glycolate, cyclovertal, lavandin oil, clary  
30 oil,  $\beta$ -damascone, geranium oil bourbon, cyclohexyl salicylate, Vertofix



Coeur, Iso-E-Super, Fixolide NP, evernyl, iraldein gamma, phenylacetic acid, geranyl acetate, benzyl acetate, rose oxide, romillate, irotyl and floramate.

5        **Antiperspirants** reduce perspiration and thus counteract underarm wetness and body odor by influencing the activity of the eccrine sweat glands. Aqueous or water-free antiperspirant formulations typically contain the following ingredients:

- astringent active principles,
- 10    • oil components,
- nonionic emulsifiers,
- co-emulsifiers,
- consistency factors,
- auxiliaries in the form of, for example, thickeners or complexing agents
- 15    and/or
- nonaqueous solvents such as, for example, ethanol, propylene glycol and/or glycerol.

Suitable astringent active principles of antiperspirants are, above all, salts of aluminium, zirconium or zinc. Suitable antihydrotic agents of this type are, for example, aluminium chloride, aluminium chlorohydrate, aluminium dichlorohydrate, aluminium sesquichlorohydrate and complex compounds thereof, for example with 1,2-propylene glycol, aluminium hydroxyallantoinate, aluminium chloride tartrate, aluminium zirconium trichlorohydrate, aluminium zirconium tetrachlorohydrate, aluminium zirconium pentachlorohydrate and complex compounds thereof, for example with amino acids, such as glycine. Oil-soluble and water-soluble auxiliaries typically encountered in antiperspirants may also be present in relatively small amounts. Oil-soluble auxiliaries such as these include, for example,

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- inflammation-inhibiting, skin-protecting or pleasant-smelling essential oils,
  - synthetic skin-protecting agents and/or
- 5     • oil-soluble perfume oils.

Typical water-soluble additives are, for example, preservatives, water-soluble perfumes, pH regulators, for example buffer mixtures, water-soluble thickeners, for example water-soluble natural or synthetic polymers  
10    such as, for example, xanthan gum, hydroxyethyl cellulose, polyvinyl pyrrolidone or high molecular weight polyethylene oxides.

Suitable **antidandruff agents** are Octopirox® (1-hydroxy-4-methyl-6-(2,4,4-trimethylpentyl)-2-(1H)-pyridinone monoethanolamine salt), Baypival, Piroctone Olamine, Ketoconazole® (4-acetyl-1-{4-[2-(2,4-  
15   dichlorophenyl) r-2-(1H-imidazol-1-ylmethyl)-1,3-dioxylan-c-4-ylmethoxy-phenyl]-piperazine, selenium disulfide, colloidal sulfur, sulfur polyethylene glycol sorbitan monooleate, sulfur ricinol polyethoxylate, sulfur tar distillate, salicylic acid (or in combination with hexachlorophene), undecylenic acid, monoethanolamide sulfosuccinate Na salt, Lamepon® UD  
20   (protein/undecylenic acid condensate), zinc pyrithione, aluminium pyrithione and magnesium pyrithione/dipyrithione magnesium sulfate.

Standard **film formers** are, for example, chitosan, microcrystalline chitosan, quaternized chitosan, polyvinyl pyrrolidone, vinyl pyrrolidone/vinyl acetate copolymers, polymers of the acrylic acid series, quaternary  
25   cellulose derivatives, collagen, hyaluronic acid and salts thereof and similar compounds.

Suitable **swelling agents** for aqueous phases are montmorillonites, clay minerals, Pemulen and alkyl-modified Carbopol types (Goodrich). Other suitable polymers and swelling agents can be found in R.  
30   Lochhead's review in **Cosm. Toil.** 108, 95 (1993).

Examples of **UV protection factors** include organic substances (light filters) which are liquid or crystalline at room temperature and which are capable of absorbing ultraviolet radiation and of releasing the energy absorbed in the form of longer-wave radiation, for example heat. UV-B  
5 filters can be oil-soluble or water-soluble. The following are examples of oil-soluble substances:

- 3-benzylidene camphor or 3-benzylidene norcamphor and derivatives thereof, for example 3-(4-methylbenzylidene)-camphor,  
10 as described in **EP 0693471 B1**;
- 4-aminobenzoic acid derivatives, preferably 4-(dimethylamino)-benzoic acid-2-ethylhexyl ester, 4-(dimethylamino)-benzoic acid-2-octyl ester and 4-(dimethylamino)-benzoic acid amyl ester;
- esters of cinnamic acid, preferably 4-methoxycinnamic acid-2-ethylhexyl ester, 4-methoxycinnamic acid propyl ester, 4-  
15 methoxycinnamic acid isoamyl ester, 2-cyano-3,3-phenylcinnamic acid-2-ethylhexyl ester (Octocrylene);
- esters of salicylic acid, preferably salicylic acid-2-ethylhexyl ester, salicylic acid-4-isopropylbenzyl ester, salicylic acid homomenthyl  
20 ester;
- derivatives of benzophenone, preferably 2-hydroxy-4-methoxy-benzophenone, 2-hydroxy-4-methoxy-4'-methylbenzophenone, 2,2'-dihydroxy-4-methoxybenzophenone;
- esters of benzalmalonic acid, preferably 4-methoxybenzalmalonic  
25 acid di-2-ethylhexyl ester;
- triazine derivatives such as, for example, 2,4,6-trianilino-(p-carbo-2'-ethyl-1'-hexyloxy)-1,3,5-triazine and Octyl Triazone as described in **EP 0 818 450 A1** or Dioctyl Butamido Triazone (Uvasorb® HEB);
- propane-1,3-diones such as, for example, 1-(4-tert.butylphenyl)-3-  
30 (4'-methoxyphenyl)-propane-1,3-dione;

- ketotricyclo(5.2.1.0)decane derivatives, as described in **EP 0 694 521 B1**.

Suitable water-soluble substances are

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- 2-phenylbenzimidazole-5-sulfonic acid and alkali metal, alkaline earth metal, ammonium, alkylammonium, alkanolammonium and glucammonium salts thereof;
- sulfonic acid derivatives of benzophenones, preferably 2-hydroxy-4-methoxybenzophenone-5-sulfonic acid and salts thereof;
- 10 ➤ sulfonic acid derivatives of 3-benzylidene camphor such as, for example, 4-(2-oxo-3-bornylidenemethyl)-benzene sulfonic acid and 2-methyl-5-(2-oxo-3-bornylidene)-sulfonic acid and salts thereof.

- 15 Typical UV-A filters are, in particular, derivatives of benzoyl methane such as, for example 1-(4'-tert.butylphenyl)-3-(4'-methoxyphenyl)-propane-1,3-dione, 4-tert-butyl-4'-methoxydibenzoylmethane (Parsol 1789), 1-phenyl-3-(4'-isopropylphenyl)-propane-1,3-dione and the enamine compounds described in **DE 19712033 A1** (BASF). The UV-A and UV-B
- 20 filters may of course also be used in the form of mixtures. Besides the soluble substances mentioned, insoluble pigments, i.e. finely dispersed metal oxides or salts, may also be used for this purpose. Examples of suitable metal oxides are, in particular, zinc oxide and titanium dioxide and also oxides of iron, zirconium, silicon, manganese, aluminium and cerium
- 25 and mixtures thereof. Silicates (talcum), barium sulfate and zinc stearate may be used as salts. The oxides and salts are used in the form of the pigments for skin-care and skin-protecting emulsions and decorative cosmetics. The particles should have an average diameter of less than 100 nm, preferably from 5 to 50 nm and more preferably from 15 to 30 nm.
- 30 They may be spherical in shape although ellipsoidal particles or other non-

spherical particles may also be used. The pigments may also be surface-treated, i.e. hydrophilicized or hydrophobicized. Typical examples are coated titanium dioxides such as, for example, Ttitanoxid T 805 (Degussa) or Eusolex® T2000 (Merck). Suitable hydrophobic coating materials are, above all, silicones and especially trialkoxyoctyl silanes or simethicones. So-called micro- or nanopigments are preferably used in sun protection products. Micronized zinc oxide is preferably used. Other suitable UV filters can be found in P. Finkel's review in **SÖFW-Journal 122, 543 (1996)**.

Besides the two above-mentioned groups of primary protection factors, secondary protection factors of the **antioxidant** type may also be used. Secondary sun protection factors of the antioxidant type interrupt the photochemical reaction chain which is initiated when UV rays penetrate into the skin. Typical examples of suitable antioxidants are amino acids (for example glycine, histidine, tyrosine, tryptophane) and derivatives thereof, imidazoles (for example urocanic acid) and derivatives thereof, peptides, such as D,L-carnosine, D-carnosine, L-carnosine and derivatives thereof (for example anserine), carotinoids, carotenes (for example  $\alpha$ -carotene,  $\beta$ -carotene, lycopene) and derivatives thereof, chlorogenic acid and derivatives thereof, liponic acid and derivatives thereof (for example dihydroliponic acid), aurothioglucose, propylthiouracil and other thiols (for example thioredoxine, glutathione, cysteine, cystine, cystamine and glycosyl, N-acetyl, methyl, ethyl, propyl, amyl, butyl and lauryl, palmitoyl, oleyl,  $\gamma$ -linoleyl, cholesteryl and glyceryl esters thereof) and their salts, dilaurylthiodipropionate, distearylthiodipropionate, thiodipropionic acid and derivatives thereof (esters, ethers, peptides, lipids, nucleotides, nucleosides and salts) and sulfoximine compounds (for example butionine sulfoximines, homocysteine sulfoximine, butionine sulfones, penta-, hexa- and hepta-thionine sulfoximine) in very small compatible dosages (for example pmole to  $\mu$ mole/kg), also (metal) chelators (for example  $\alpha$ -

hydroxyfatty acids, palmitic acid, phytic acid, lactoferrine),  $\alpha$ -hydroxy acids (for example citric acid, lactic acid, malic acid), humic acid, bile acid, bile extracts, bilirubin, biliverdin, EDTA, EGTA and derivatives thereof, unsaturated fatty acids and derivatives thereof (for example  $\gamma$ -linolenic acid, 5 linoleic acid, oleic acid), folic acid and derivatives thereof, ubiquinone and ubiquinol and derivatives thereof, vitamin C and derivatives thereof (for example ascorbyl palmitate, Mg ascorbyl phosphate, ascorbyl acetate), tocopherols and derivatives (for example vitamin E acetate), vitamin A and derivatives (vitamin A palmitate) and coniferyl benzoate of benzoin resin, 10 rutinic acid and derivatives thereof,  $\alpha$ -glycosyl rutin, ferulic acid, furfurylidene glucitol, carnosine, butyl hydroxytoluene, butyl hydroxylanisole, nordihydroguaiaic resin acid, nordihydroguaiaic acid, trihydroxy-butyrophenone, uric acid and derivatives thereof, mannose and derivatives thereof, Superoxid-Dismutase, zinc and derivatives thereof (for example 15 ZnO, ZnSO<sub>4</sub>), selenium and derivatives thereof (for example selenium methionine), stilbenes and derivatives thereof (for example stilbene oxide, trans-stilbene oxide) and derivatives of these active substances suitable for the purposes of the invention (salts, esters, ethers, sugars, nucleotides, nucleosides, peptides and lipids).

20 In addition, **hydrotropes** such as, for example, ethanol, isopropyl alcohol or polyols may be used to improve flow behavior. Suitable polyols preferably contain 2 to 15 carbon atoms and at least two hydroxyl groups. The polyols may contain other functional groups, especially amino groups, or may be modified with nitrogen. Typical examples are

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- glycerol;
- alkylene glycols such as, for example, ethylene glycol, diethylene glycol, propylene glycol, butylene glycol, hexylene glycol and polyethylene glycols having an average molecular weight of 100 to 30 1,000 dalton;

- technical oligoglycerol mixtures with a degree of self-condensation of 1.5 to 10 such as, for example, technical diglycerol mixtures with a diglycerol content of 40 to 50% by weight;
- methylol compounds such as, in particular, trimethylol ethane, trimethylol propane, trimethylol butane, pentaerythritol and dipentaerythritol;
- lower alkyl glucosides, particularly those containing 1 to 8 carbon atoms in the alkyl group, for example methyl and butyl glucoside;
- sugar alcohols containing 5 to 12 carbon atoms such as, for example, sorbitol or mannitol;
- sugars containing 5 to 12 carbon atoms such as, for example, glucose or sucrose;
- aminosugars such as, for example, glucamine;
- dialcoholamines, such as diethanolamine or 2-aminopropane-1,3-diol.

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Suitable **preservatives** are, for example, phenoxyethanol, formaldehyde solution, parabens, pentanediol or sorbic acid and the other classes of compounds listed in **Appendix 6, Parts A and B** of the **Kosmetikverordnung** ("Cosmetics Directive"). Suitable **insect repellents** are N,N-diethyl-m-toluamide, pentane-1,2-diol or Ethyl Butylacetylaminopropionate. A suitable **self-tanning agent** is dihydroxyacetone. Suitable tyrosine inhibitors which prevent the formation of melanin and are used in depigmenting agents are, for example, arbutin, koji acid, coumaric acid and ascorbic acid (vitamin C).

25

Suitable **perfume oils** are mixtures of natural and synthetic fragrances. Natural fragrances include the extracts of blossoms (lily, lavender, rose, jasmine, neroli, ylang-ylang), stems and leaves (geranium, patchouli, petitgrain), fruits (anise, coriander, caraway, juniper), fruit peel (bergamot, lemon, orange), roots (nutmeg, angelica, celery, cardamon, costus, iris, calmus), woods (pinewood, sandalwood, guaiac wood,

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cedarwood, rosewood), herbs and grasses (tarragon, lemon grass, sage, thyme), needles and branches (spruce, fir, pine, dwarf pine), resins and balsams (galbanum, elemi, benzoin, myrrh, olibanum, opoponax). Animal raw materials, for example civet and beaver, may also be used. Typical

5 synthetic perfume compounds are products of the ester, ether, aldehyde, ketone, alcohol and hydrocarbon type. Examples of perfume compounds of the ester type are benzyl acetate, phenoxyethyl isobutyrate, p-tert.butyl cyclohexylacetate, linalyl acetate, dimethyl benzyl carbonyl acetate, phenyl ethyl acetate, linalyl benzoate, benzyl formate, ethylmethyl phenyl

10 glycinate, allyl cyclohexyl propionate, styryl propionate and benzyl salicylate. Ethers include, for example, benzyl ethyl ether while aldehydes include, for example, the linear alkanals containing 8 to 18 carbon atoms, citral, citronellal, citronellyloxyacetaldehyde, cyclamen aldehyde, hydroxycitronellal, lilyal and bourgeonal. Examples of suitable ketones are

15 the ionones,  $\alpha$ -isomethylionone and methyl cedryl ketone. Suitable alcohols are anethol, citronellol, eugenol, isoeugenol, geraniol, linalool, phenylethyl alcohol and terpineol. The hydrocarbons mainly include the terpenes and balsams. However, it is preferred to use mixtures of different perfume compounds which, together, produce an agreeable fragrance.

20 Other suitable perfume oils are essential oils of relatively low volatility which are mostly used as aroma components. Examples are sage oil, camomile oil, clove oil, melissa oil, mint oil, cinnamon leaf oil, lime-blossom oil, juniper berry oil, vetiver oil, olibanum oil, galbanum oil, labolanum oil and lavandin oil. The following are preferably used either individually or in

25 the form of mixtures: bergamot oil, dihydromyrcenol, lilyal, lylal, citronellol, phenylethyl alcohol,  $\alpha$ -hexylcinnamaldehyde, geraniol, benzyl acetone, cyclamen aldehyde, linalool, Boisambrene Forte, Ambroxan, indole, hedione, sandelice, citrus oil, mandarin oil, orange oil, allylamyl glycolate, cyclovertal, lavandin oil, clary oil,  $\beta$ -damascone, geranium oil bourbon,

30 cyclohexyl salicylate, Vertofix Coeur, Iso-E-Super, Fixolide NP, evernyl,



iraldein gamma, phenylacetic acid, geranyl acetate, benzyl acetate, rose oxide, romillat, irotyl and floramat.

Suitable **dyes** are any of the substances suitable and approved for cosmetic purposes as listed, for example, in the publication "**Kosmetische**  
5 **Färbemittel**" of the **Farbstoffkommission der Deutschen Forschungsgemeinschaft, Verlag Chemie, Weinheim, 1984, pages 81 to 106**. These dyes are normally used in concentrations of 0.001 to 0.1% by weight, based on the mixture as a whole.

The total percentage content of auxiliaries and additives may be  
10 from 1 to 50% by weight and is preferably from 5 to 40% by weight, based on the particular composition. The preparations may be produced by standard hot or cold processes and are preferably produced by the phase inversion temperature method.

#### 15 **Examples**

Foaming behavior was determined to DIN 53 902 using 1% by weight solutions and a foaming machine (20°C, 16°d, 1% by weight sebum challenge). Skin irritation potential was determined by OECD Method No. 404 and EEC Directive 84/449 EEC, Pt. B. 4 using 5% by weight solutions.  
20 The total irritation scores shown were calculated from the irritation scores obtained after 24, 48 and 72 hours. The total irritation score determined in comparison test C1 for a 100% C<sub>12-14</sub> alkyl oligoglucoside was put at 100% and the total irritation scores obtained in the other tests were related to that score. The results are set out in Table 1. Table 2 contains numerous  
25 Formulation Examples.

**Table 1**

Composition, foaming capacity and dermatological compatibility of surfactant mixtures

Composition/performance	1	2	3	4	C1	C2	C3	C4
C <sub>12/14</sub> cocoalkyl oligoglucoside	50	-	75	90	100	-	-	-
C <sub>8/18</sub> cocoalkyl oligoglucoside	-	60	-	-	-	100	-	-
C <sub>12/14</sub> cocoalkyl oligoglucoside tartrate <sup>1)</sup>	-	-	-	-	-	-	100	50
Tartaric acid monolaurylester, Na salt	50	-	-	10	-	-	-	50
Malic acid monolaurylester, Na salt	-	40	-	-	-	-	-	-
Citric acid dicocoylester, Na salt	-	-	25	-	-	-	-	-
<b>Foaming capacity [ml]</b>								
- basic foam	300	330	270	180	120	150	170	100
- foam height after 20 mins.	180	220	180	150	20	30	40	0
Total irritation score [%]	41	45	43	67	100	98	109	58

<sup>1)</sup> Eucarol® AGE, Lamberti/IT.

**Table 2.****Cosmetic preparations (water, preservative to 100% by weight)**

<b>Composition (INCI)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>Texapon® NSO</b> Sodium Laureth Sulfate	-	-	-	-	-	-	38.0	38.0	25.0	-
<b>Texapon® SB 3</b> Disodium Laureth Sulfosuccinate	-	-	-	-	-	-	-	-	10.0	-
<b>Plantacare® 818</b> Coco Glucosides	-	-	-	1.0	-	-	7.0	7.0	6.0	-
<b>Plantacare® PS 10</b> Sodium Laureth Sulfate (and) Coco Glucosides	1.0	1.0	1.0	-	1.0	1.0	-	-	-	16.0
<b>Dehyton® PK 45</b> Cocamidopropyl Betaine	-	-	-	-	-	-	-	-	10.0	-
<b>Dehyquart® A</b> Cetrimonium Chloride	2.0	2.0	2.0	2.0	4.0	4.0	-	-	-	-
<b>Dehyquart L® 80</b> Dicocoylmethylethoxymonium Methosulfate (and) Propyleneglycol	1.2	1.2	1.2	1.2	0.6	0.6	-	-	-	-
<b>Eumulgin® B2</b> Ceteareth-20	0.8	0.8	-	0.8	-	1.0	-	-	-	-
<b>Eumulgin® VL 75</b> Lauryl Glucoside (and) Polyglyceryl-2 Polyhydroxystearate (and) Glycerin	-	-	0.8	-	0.8	-	-	-	-	-
<b>Lanette® O</b> Cetearyl Alcohol	2.5	2.5	2.5	2.5	3.0	2.5	-	-	-	-
<b>Cutina® GMS</b> Glyceryl Stearate	0.5	0.5	0.5	0.5	0.5	1.0	-	-	-	-
<b>Cetiol® HE</b> PEG-7 Glyceryl Cocoate	1.0	-	-	-	-	-	-	-	1.0	-
<b>Cetiol® PGL</b> Hexyldecanol (and) Hexyldecyl laurate	-	1.0	-	-	1.0	-	-	-	-	-
<b>Cetiol® V</b> Decyl Oleate	-	-	-	1.0	-	-	-	-	-	-
<b>Eutanol® G</b> Octyldodecanol	-	-	1.0	-	-	1.0	-	-	-	-
<b>Nutrilan® Keratin W</b> Hydrolyzed Keratin	-	-	-	2.0	-	-	-	-	-	-
<b>Lamesoft® LMG</b> Glyceryl Laurate (and) Potassium Cocoyl Hydrolyzed Collagen	-	-	-	-	-	-	3.0	2.0	4.0	-
<b>Euperlan® PK 3000 AM</b> Glycol Distearate (and) Laureth-4 (and) Cocamidopropyl Betaine	-	-	-	-	-	-	-	3.0	5.0	5.0
<b>Generol® 122 N</b> Soja Sterol	-	-	-	-	1.0	1.0	-	-	-	-
<b>Hydagen® CMF</b> Chitosan	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
<b>Sodium Lauryl Tartrate</b>	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
<b>Copherol® 12250</b> Soja Sterol	-	-	0.1	0.1	-	-	-	-	-	-
<b>Arlypon® F</b> Laureth-2	-	-	-	-	-	-	3.0	3.0	1.0	-
<b>Sodium Chloride</b>	-	-	-	-	-	-	-	1.5	-	1.5

(1-4) hair rinse, (5-6) hair conditioner, (7-8) shower bath, (9) shower gel, (10) wash lotion

**Table 2.****Cosmetic preparations (water, preservative to 100% by weight) - continuation 1**

<b>Composition (INCI)</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>
<b>Texapon® NSO</b> Sodium Laureth Sulfate	20.0	20.0	12.4	-	25.0	11.0	-	-	-	-
<b>Texapon® K 14 S</b> Sodium Myreth Sulfate	-	-	-	-	-	-	-	-	11.0	23.0
<b>Texapon® SB 3</b> Disodium Laureth Sulfosuccinate	-	-	-	-	-	7.0	-	-	-	-
<b>Plantacare® 818</b> Coco Glucosides	5.0	5.0	4.0	-	-	-	-	-	6.0	4.0
<b>Plantacare® 2000</b> Decyl Glucoside	-	-	-	1.0	5.0	4.0	-	-	-	-
<b>Plantacare® PS 10</b> Sodium Laureth Sulfate (and) Coco Glucosides	-	-	-	40.0	-	-	16.0	17.0	-	-
<b>Dehyton® PK 45</b> Cocamidopropyl Betaine	20.0	20.0	-	-	8.0	-	-	-	-	7.0
<b>Eumulgin® B1</b> Ceteareth-12	-	-	-	-	1.0	-	-	-	-	-
<b>Eumulgin® B2</b> Ceteareth-20	-	-	-	1.0	-	-	-	-	-	-
<b>Lameform® TGI</b> Polyglyceryl-3 Isostearate	-	-	-	4.0	-	-	-	-	-	-
<b>Dehymuls® PGPH</b> Polyglyceryl-2 Dipolyhydroxystearate	-	-	1.0	-	-	-	-	-	-	-
<b>Monomuls® 90-L 12</b> Glyceryl Laurate	-	-	-	-	-	-	-	-	1.0	1.0
<b>Cetiol® HE</b> PEG-7 Glyceryl Cocoate	-	0.2	-	-	-	-	-	-	-	-
<b>Eutanol® G</b> Octyldodecanol	-	-	-	3.0	-	-	-	-	-	-
<b>Nutrilan® Keratin W</b> Hydrolyzed Keratin	-	-	-	-	-	-	-	-	2.0	2.0
<b>Nutrilan® I</b> Hydrolyzed Collagen	1.0	-	-	-	-	2.0	-	2.0	-	-
<b>Lamesoft® LMG</b> Glyceryl Laurate (and) Potassium Cocoyl Hydrolyzed Collagen	-	-	-	-	-	-	-	-	1.0	-
<b>Lamesoft® 156</b> Hydrogenated Tallow Glyceride (and) Potassium Cocoyl Hydrolyzed Collagen	-	-	-	-	-	-	-	-	-	5.0
<b>Gluadin® WK</b> Sodium Cocoyl Hydrolyzed Wheat Protein	1.0	1.5	4.0	1.0	3.0	1.0	2.0	2.0	2.0	-
<b>Euperlan® PK 3000 AM</b> Glycol Distearate (and) Laureth-4 (and) Cocamidopropyl Betaine	5.0	3.0	4.0	-	-	-	-	3.0	3.0	-
<b>Panthenol</b>	-	-	1.0	-	-	-	-	-	-	-
<b>Arlypon® F</b> Laureth-2	2.6	1.6	-	1.0	1.5	-	-	-	-	-
<b>Sodium Lauryl Tartrate</b>	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
<b>Hydagen® CMF</b> Chitosan	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
<b>Sodium Chloride</b>	-	-	-	-	-	1.6	2.0	2.2	-	3.0
<b>Glycerin (86% by weight)</b>	-	5.0	-	-	-	-	-	1.0	3.0	-

(11-14) "2-in-1" shower bath, (15-20) shampoo

**Table 2.****Cosmetic preparations (water, preservative to 100% by weight) - continuation 2**

Composition (INCI)	21	22	23	24	25	26	27	28	29	30
<b>Texapon® NSO</b> Sodium Laureth Sulfate	-	30.0	30.0	-	25.0	-	-	-	-	-
<b>Plantacare® 818</b> Coco Glucosides	-	10.0	-	-	20.0	1.0	1.0	1.0	1.0	1.0
<b>Plantacare® PS 10</b> Sodium Laureth Sulfate (and) Coco Glucosides	22.0	-	5.0	22.0	-	-	-	-	-	-
<b>Dehyton® PK 45</b> Cocamidopropyl Betaine	15.0	10.0	15.0	15.0	20.0	-	-	-	-	-
<b>Emulgade® SE</b> Glyceryl Stearate (and) Ceteareth 12/20 (and) Cetearyl Alcohol (and) Cetyl Palmitate	-	-	-	-	-	5.0	5.0	4.0	-	-
<b>Eumulgin® B1</b> Ceteareth-12	-	-	-	-	-	-	-	1.0	-	-
<b>Lameform® TGI</b> Polyglyceryl-3 Isostearate	-	-	-	-	-	-	-	-	4.0	-
<b>Dehymuls® PGPH</b> Polyglyceryl-2 Dipolyhydroxystearate	-	-	-	-	-	-	-	-	-	4.0
<b>Monomuls® 90-O 18</b> Glyceryl Oleate	-	-	-	-	-	-	-	-	2.0	-
<b>Cetiol® HE</b> PEG-7 Glyceryl Cocoate	2.0	-	-	2.0	5.0	-	-	-	-	2.0
<b>Cetiol® OE</b> Dicaprylyl Ether	-	-	-	-	-	-	-	-	5.0	6.0
<b>Cetiol® PGL</b> Hexyldecanol (and) Hexyldecyl Laurate	-	-	-	-	-	-	-	3.0	10.0	9.0
<b>Cetiol® SN</b> Cetearyl Isononanoate	-	-	-	-	-	3.0	3.0	-	-	-
<b>Cetiol® V</b> Decyl Oleate	-	-	-	-	-	3.0	3.0	-	-	-
<b>Myritol® 318</b> Coco Caprylate Caprate	-	-	-	-	-	-	-	3.0	5.0	5.0
<b>Bees Wax</b>	-	-	-	-	-	-	-	-	7.0	5.0
<b>Nutrilan® Elastin E20</b> Hydrolyzed Elastin	-	-	-	-	-	2.0	-	-	-	-
<b>Nutrilan® I-50</b> Hydrolyzed Collagen	-	-	-	-	2.0	-	2.0	-	-	-
<b>Gludatin® AGP</b> Hydrolyzed Wheat Gluten	0.5	0.5	0.5	-	-	-	-	0.5	-	-
<b>Gludatin® WK</b> Sodium Cocoyl Hydrolyzed Wheat Protein	2.0	2.0	2.0	2.0	5.0	-	-	-	0.5	0.5
<b>Euperlan® PK 3000 AM</b> Glycol Distearate (and) Laureth-4 (and) Cocamidopropyl Betaine	5.0	-	-	5.0	-	-	-	-	-	-
<b>Arlypon® F</b> Laureth-2	-	-	-	-	-	-	-	-	-	-
<b>Sodium Cetyl Tartrate</b>	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
<b>Hydagen® CMF</b> Chitosan	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
<b>Magnesium Sulfate Heptahydrate</b>	-	-	-	-	-	-	-	-	1.0	1.0
<b>Glycerin (86% by weight)</b>	-	-	-	-	-	3.0	3.0	5.0	5.0	3.0

(21-25) foam bath, (26) soft cream, (27,28) moisturizing emulsion, (29,30) night cream)

**Table 2.****Cosmetic preparations (water, preservative to 100% by weight) - continuation 3**

Composition (INCI)	31	32	33	34	35	36	37	38	39	40
<b>Dehymuls® PGPH</b> Polyglyceryl-2 Dipolyhydroxystearate	4.0	3.0	-	5.0	-	-	-	-	-	-
<b>Lameform® TGI</b> Polyglyceryl-3 Disostearate	2.0	1.0	-	-	-	-	-	-	-	-
<b>Emulgade® PL 68/50</b> Cetearyl Glucoside (and) Cetearyl Alcohol	1.0	1.0	1.0	1.0	4.0	1.0	1.0	1.0	3.0	1.0
<b>Eumulgin® B2</b> Ceteareth-20	-	-	-	-	-	-	-	2.0	-	-
<b>Tegocare® PS</b> Polyglyceryl-3 Methylglucose Distearate	-	-	3.0	-	-	-	4.0	-	-	-
<b>Eumulgin VL 75</b> Polyglyceryl-2 Dipolyhydroxystearate (and) Lauryl Glucoside (and) Glycerin	-	-	-	-	-	3.5	-	-	2.5	-
<b>Bees Wax</b>	3.0	2.0	5.0	2.0	-	-	-	-	-	-
<b>Cutina® GMS</b> Glyceryl Stearate	-	-	-	-	-	2.0	4.0	-	-	4.0
<b>Lanette® O</b> Cetearyl Alcohol	-	-	2.0	-	2.0	4.0	2.0	4.0	4.0	1.0
<b>Antaron® V 216</b> PVP / Hexadecene Copolymer	-	-	-	-	-	3.0	-	-	-	2.0
<b>Myritol® 818</b> Cocoglycerides	5.0	-	10.0	-	8.0	6.0	6.0	-	5.0	5.0
<b>Finsolv® TN</b> C12/15 Alkyl Benzoate	-	6.0	-	2.0	-	-	3.0	-	-	2.0
<b>Cetiol® J 600</b> Oleyl Erucate	7.0	4.0	3.0	5.0	4.0	3.0	3.0	-	5.0	4.0
<b>Cetiol® OE</b> Dicapryl Ether	3.0	-	6.0	8.0	6.0	5.0	4.0	3.0	4.0	6.0
<b>Mineral Oil</b>	-	4.0	-	4.0	-	2.0	-	1.0	-	-
<b>Cetiol® PGL</b> Hexadecanol (and) Hexyldecyl Laurate	-	7.0	3.0	7.0	4.0	-	-	-	1.0	-
<b>Panthenol / Bisabolol</b>	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
<b>Sodium Cetyl Tartrate</b>	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
<b>Hydagen® CMF</b> Chitosan	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
<b>Copherol® F 1300</b> Tocopherol / Tocopheryl Acetate	0.5	1.0	1.0	2.0	1.0	1.0	1.0	2.0	0.5	2.0
<b>Neo Heliopan® Hydro</b> Sodium Phenylbenzimidazole Sulfonate	3.0	-	-	3.0	-	-	2.0	-	2.0	-
<b>Neo Heliopan® 303</b> Octocrylene	-	5.0	-	-	-	4.0	5.0	-	-	10.0
<b>Neo Heliopan® BB</b> Benzophenone-3	1.5	-	-	2.0	1.5	-	-	-	2.0	-
<b>Neo Heliopan® E 1000</b> Isoamyl p-Methoxycinnamate	5.0	-	4.0	-	2.0	2.0	4.0	10.0	-	-
<b>Neo Heliopan® AV</b> Octyl Methoxycinnamate	4.0	-	4.0	3.0	2.0	3.0	4.0	-	10.0	2.0
<b>Uvinol® T 150</b> Octyl Triazone	2.0	4.0	3.0	1.0	1.0	1.0	4.0	3.0	3.0	3.0
<b>Zinc Oxide</b>	-	6.0	6.0	-	4.0	-	-	-	-	5.0
<b>Titanium Dioxide</b>	-	-	-	-	-	-	-	5.0	-	-
<b>Glycerin (86% by weight)</b>	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

(31) w/o sun cream, (32-34) w/o sun lotion, (35,38,40) o/w sun lotion, (36,37,39) o/w sun cream